BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 4 JANUARY 1958 PART 5

NEW YEAR MESSAGE FROM THE PRESIDENT

It gives me great pleasure to send good wishes for the New Year to my fellow members. In 1958, the Jubilee Year of our Institute, we may justifiably feel proud of its achievements in the first fifty years. The great expectations of our Founder Members have been more than realized, both with regard to the growth of membership and the work which the Institute has done to promote the science and practice of non-ferrous metallurgy.

The scope of our activities has gradually widened, and today an unparalleled opportunity exists for making contributions to world-wide progress in atomic power, aerial transport, chemical engineering, and other important spheres of development.

With the record of the first fifty years behind us, I wish increasing success to the Institute as it moves off towards the century mark.

L. B. Pfeil.

Symposium on "Metallurgical Aspects of Semi-Conductors"

A one-day symposium on "Metallurgical Aspects of Semi-Conductors", arranged by the Metal Physics Committee of the Institute, will be held on Tuesday, 25 February 1958, at the College of Technology, Gosta Green, Birmingham. There will be two sessions, beginning at 9.30 a.m. and 2.15 p.m. A number of short papers will be presented, but no preprints will be available. It is hoped to arrange a small exhibition in conjunction with the symposium. Further details will be given in the February issue of the *Bulletin*.

INSTITUTE NEWS

Outline Programme of the Jubilee Spring Meeting

The Jubilee Spring Meeting of the Institute will be held in London on 28 April–2 May, 1958. The main items of the programme are given below. A more detailed programme will be issued later.

Monday, 28 April

All-day. Registration of members and delegates.
Evg. Golden Jubilee Lecture by Professor R. S. HUTTON, Original Member and Fellow, followed by a social function.

Tuesday, 29 April

Location: Church House, Westminster.

Morn. Annual General Meeting.
Induction of new President.
Brief speech of congratulation on behalf of allied societies.
Presentation of medals.
Noon Cocktail party.
Aft. May Lecture on fifty years' progress in metallurgical science, by Professor A. G. QUARRELL (followed by a discussion).
Evg. Council Dinner for distinguished guests.

Wednesday, 30 April

Morn. Two concurrent scientific sessions.
Aft. Two concurrent scientific sessions.
Evg. Reception.

Thursday, 1 May

Morn. Two concurrent scientific sessions:
(i) Symposium on "Advances in Inspection Techniques as Aids to Process Control in Non-Ferrous Metals Production", arranged by the Metallurgical Engineering Committee.
(ii) Session related to nuclear energy.
Aft. Two concurrent scientific sessions
(i) Symposium on "Advances in Inspection Techniques as Aids to Process Control in Non-Ferrous Metals Production" (continued).
(ii) Symposium on "Plutonium and Methods of Handling It", arranged by the Nuclear Energy Committee.
Evg. Golden Jubilee Banquet in the Great Room, Grosvenor House.

Friday, 2 May

All-day Visits to works and laboratories in London and its environs.

Election of Council for 1958–59

In accordance with the Articles of Association, the following are due to retire from the Council at the 1958 Annual General Meeting: *President:* L. B. PFEIL, O.B.E., D.Sc., A.R.S.M., F.I.M., F.R.S. *Past-President:* S. F. DOREY, C.B.E., D.Sc., M.I.C.E., M.I.Mech.E., F.R.S. *Vice-Presidents:* E. H. JONES, A.R.I.C., M.I.M.M., F.I.M., and W. J. THOMAS, M.I.Mech.E., M.I.E.E. *Ordinary Members of Council:* R. D. HAMER, B.Sc., Dipl.Ing., F.I.M., and G. P. TINKER, M.Sc., F.I.M.

In addition, a vacancy exists on the Council owing to the death of Mr. J. W. BERRY (*Ordinary Member of Council*).

Under Article 19, L. B. PFEIL, O.B.E., D.Sc., A.R.S.M., F.I.M., F.R.S., will fill the vacancy on the Council as Past-President.

In accordance with Article 22, the Council nominates the following members to fill vacancies:

As President:

Marshal of the Royal Air Force the Right Hon. the Lord TEDDER, G.C.B., D.C.L., Hon. LL.D., Chancellor, University of Cambridge; Chairman, Standard Motor Co., Ltd.

As Vice-Presidents:

G. L. BAILEY, C.B.E., M.Sc., F.I.M., Director, British Non-Ferrous Metals Research Association.

R. D. HAMER, B.Sc., Dipl.Ing., F.I.M., Vice-President and Director, Aluminium Laboratories, Ltd.

Sir RONALD PRAIN, O.B.E., Chairman and President, Rhodesian Selection Trust, Ltd., and Roan Antelope Copper Mines, Ltd.

As Ordinary Members of Council:

The Hon. GEOFFREY CUNLIFFE, Deputy Chairman and Joint Managing Director, The British Aluminium Co., Ltd.

L. B. HUNT, M.Sc., Ph.D., A.R.C.S., F.R.I.C., F.I.M., Manager (Industrial Division), Johnson, Matthey and Co., Ltd.

The Right Hon. the Lord KIRKWOOD OF BEARSDEN, Director, Imperial Smelting Corporation, Ltd.

W. F. RANDALL, B.Sc., A.R.S.M., M.I.E.E., F.I.M., Director, Telegraph Construction and Maintenance Co., Ltd.

F. W. TOMLINSON, M.A., M.I.E.E., Managing Director, Pyrotenax, Ltd.

Members are reminded that, in accordance with Article 22, any ten members may also at, or before, the business part of a General Meeting to be held at the College of Technology, Gosta Green, Birmingham, on 26 February, 1958, at 10.30 a.m., nominate in writing, with the written consent to act if elected of the person nominated, any duly qualified person other than those nominated by the Council, to fill any vacancy on the Council, but each such nominator is debarred from nominating any other person for the same election. If any two or more persons are nominated for any honorary office, they (or such of them as are not Ordinary Members of Council who are not retiring at the next Annual General Meeting) will be deemed to have been nominated also for any vacancies among the Ordinary Members of Council. No person is eligible to fill any vacancy at such Annual General Meeting unless he has consented in writing to be nominated and has been nominated or deemed to be nominated for the same in compliance with this Article.

Senior Vice-President 1958–59

The Council has elected Mr. G. L. BAILEY, C.B.E., M.Sc., F.I.M., to serve as Senior Vice-President for 1958–59 and he will be its nominee for the Presidency in 1959–60.

Election of Members

The following 13 Ordinary Members, 3 Junior Members, and 44 Student Members were elected on 27 November 1957:

As Ordinary Members

BARKER, Peter Denis, Northern Representative, Johnson, Matthey and Co., Ltd., 73–83 Hatton Garden, London, E.C.1.

BIRCH, Frank George, Foundry Superintendent, Midco Steam Specialities, Ltd., Colliery Road, Nottingham.

BUNGE, Hans-Joachim, Dr.rer.nat., Physiker, Kristallstrukturanalyse, Deutsche Akademie der Wissenschaften, Rudower Chaussee, Berlin-Adlershof, Germany.

CAYLESS, Roland Barrie Charles, B.Sc., Metallurgist, Northern Aluminium Co., Ltd., Rogerstone, Newport, Mon.

FISCHEL, John Hans, Company Director, 35 Dover Street, London, W.1.

FORTINO, Dario, Dott.ing., V. Capo Servicio raggente il Laboratorio Ricerche e Controlli, Stabilimento Fonderie e Fucine, FIAT, Corso 9, Agnelli No. 250, Torino, Italy.

GROVES, Leslie George, Ph.D., M.Sc., A.M.I.Chem.E., Managing Director, Davy British Oxygen, Ltd., Market House, Stone Cross, Harlow, Essex.

JACKSON, George Henry, F.I.M., Technical Officer, Association of Drop Forgers and Stampers, Grove Hill House, 245 Grove Lane, Handsworth, Birmingham 20.

DE JAGER, Willem Gustaaf Rudolf, Ir., Leider Non-Ferro Afdeling, Metaalinstituut T.N.O., Postbus 49, Delft, Netherlands.

KIEFT, Cyril William, Director, Cyril Kieft and Co., Ltd., Reliance Works, Derry Street, Wolverhampton.

LOWE, William Lawson, Deputy Chief Metallurgist, Aeroplane and Aluminium Castings, Ltd., Wood Lane, Erdington, Birmingham.

ROBINSON, Peter, L.I.M., Assistant to the Cold Rolling Mill Manager, Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham 16.

STANTON, William Lawton, A.C.T.(Birm.), L.I.M., Senior Technical Officer, Imperial Chemical Industries, Ltd., Metals Division, Kynoch Works, Birmingham 6.

As Junior Members

MARPLES, James Angwin Chisholm, B.A., Scientific Officer, Metallurgy Division, Atomic Energy Research Establishment, Harwell, Berks.

PEACOCK, Thomas Edward, B.Sc., A.R.I.C., Ramsay Memorial Research Fellow, Department of Mathematics, University College of North Staffordshire, Keele, Newcastle-under-Lyme, Staffs.

ROSE, Kenneth, B.Sc., Investigator, British Non-Ferrous Metals Research Association, Euston Street, London, N.W.1.

As Student Members

BALE, Michael Godfrey, Undergraduate, Department of Metallurgy, University College, Cardiff.

BASTERFIELD, James, Undergraduate, Department of Metallurgy, University of Birmingham.

BEARDMORE, Peter, Undergraduate, Department of Metallurgy, University of Sheffield.

BENSA, George Romeril, B.Met., Metallurgist, Department of Research and Technical Development, Stewarts and Lloyds, Ltd., Corby, Northants.

BUTT, Ronald John, Undergraduate, Department of Metallurgy, University of Birmingham.

DALE, Brian George, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

DEEGAN, John Francis, Undergraduate, Department of Metallurgy, University of Liverpool.

EVANS, David Roger, Undergraduate, Department of Metallurgy, University of Cambridge.

FELL, John Howard, 56 Chestnut Drive, Erdington, Birmingham 24.

FOLEY, Ivor George, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

GLOYN-COX, Laurence David, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

HAGGETT, Roger George, Undergraduate, Department of Metallurgy, University of Cambridge.

HEADWORTH, David Martin, B.Sc., Graduate Student, Department of Metallurgy, University College, Cardiff.

HICKS, Brian, Undergraduate, Department of Metallurgy, University College, Swansea.

HINES, George Francis, Laboratory Assistant, British Non-Ferrous Metals Research Association, Euston Street, London, N.W.1.

HOPKINS, David Terence, Undergraduate, Department of Metallurgy, University College, Swansea.

HUGILL, John Martin, Student, 7 Polwarth Road, Brunton Park, Newcastle-upon-Tyne 3.

JEFFERIES, Walter, Undergraduate, King's College, Newcastle-upon-Tyne.

KUROPATWA, Leopold, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

LOWE, William Alan, Laboratory Assistant, Research Department, Imperial Chemical Industries, Ltd., Metals Division, Kynoch Works, Birmingham 6.

MCARTHUR, Hugh, Undergraduate, Department of Metallurgy, University of Cambridge.

MOORE, Donald Avon, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

MORTON, Herbert Francis, Technical Assistant, Metallurgical Research Department, Magnesium Elektron, Ltd., Clifton Junction, near Manchester.

MOSELEY, John Michael, Metallurgist, Baxters (Bolts, Screws and Rivets), Ltd., Sheepcote St., Birmingham 15.

MYNOTT, Colin Burnell, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

NORMINGTON, Frederick William, Undergraduate, Department of Metallurgy, University of Cambridge.

NORTHCOTT, William John, Undergraduate, Department of Metallurgy, University of Cambridge.

OATES, Graham, Undergraduate, Department of Metallurgy, University of Birmingham.

PEARSON, Alan William, L.I.M., Laboratory Assistant, Research Laboratories, The British Aluminium Co., Ltd., Chalfont Park, Gerrards Cross, Bucks.

PEART, Reginald Francis, B.Sc., Postgraduate Student, Physics Research Laboratories, University of Reading.

PUGH, Brian Ewart, Laboratory Assistant, Research Department, Imperial Chemical Industries, Ltd., Metals Division, Kynoch Works, Birmingham 6.

RAY, Malcolm John, Student Apprentice in Metallurgy, G.K.N. Group Research Laboratories, Lanesfield, Wolverhampton.

REEVES, George Jeffrey, Undergraduate, Department of Metallurgy, University of Manchester.

RICHARDS, Geoffrey Llewellyn, Undergraduate, Department of Metallurgy, University College, Cardiff.

ROSE, Kelvin Stewart Beresford, Undergraduate, Department of Metallurgy, University of Birmingham.

SCHOMBERG, Stanley, Undergraduate, Department of Metallurgy, University of Nottingham.

SCULLY, John Christopher, Undergraduate, Department of Metallurgy, University of Cambridge.

THOMAS, William Hywel James, Undergraduate, Department of Metallurgy, University College, Cardiff.

WALDRON, Geoffrey William James, B.Sc., Research Student, Department of Industrial Metallurgy, University of Birmingham.

WALLIS, David Richard, B.Sc., Metallurgist, Research Laboratories, The General Electric Co., Ltd., North Wembley, Middx.

WALTERS, Cedric Norman, B.A., Undergraduate, Department of Metallurgy, University of Cambridge.

WEAVER, Michael James Douglas, Undergraduate, Royal School of Mines, University of London, London, S.W.7.

WHITEMAN, John Anthony, Undergraduate, Department of Metallurgy, University of Birmingham.

YEARSLEY, Anthony Vyvyan, Undergraduate, Department of Metallurgy, University of Cambridge.

PERSONAL NOTES

DR. R. L. BELL has left the Royal Radar Establishment, Malvern, and is now at the Imperial College of Science and Technology, London.

DR. F. P. BOWDEN has been elected to a professorial Fellowship at Gonville and Caius College, Cambridge.

MR. J. A. COILEY has left Cambridge University and is now at the Atomic Energy Research Establishment, Harwell.

MR. F. P. ELLEN is now at the Dounreay Works of the Atomic Energy Authority.

DR. W. HUME-ROTHERY has been appointed first Wolfson Professor of Metallurgy in the University of Oxford.

DR. W. J. KROLL has been awarded the 1958 Perkins Medal of the American Section of the Society of Chemical Industry.

DR. E. MEHL has left McKechnie Brothers, Ltd., and joined Deloro Smelting and Refining Company, Deloro, Ont., Canada.

DR. C. S. SMITH, Professor of Metallurgy at the Institute for the Study of Metals, Chicago, has been elected to the National Academy of Sciences.

MR. H. H. SMITH has left Colvilles, Ltd., to become a metallurgist on the staff of The English Electric Co., Ltd., Whetstone, near Leicester.

MR. A. L. STOTT has left Sheffield University, where he obtained a B.Met. degree, and has taken up an appointment with the U.K. Atomic Energy Authority.

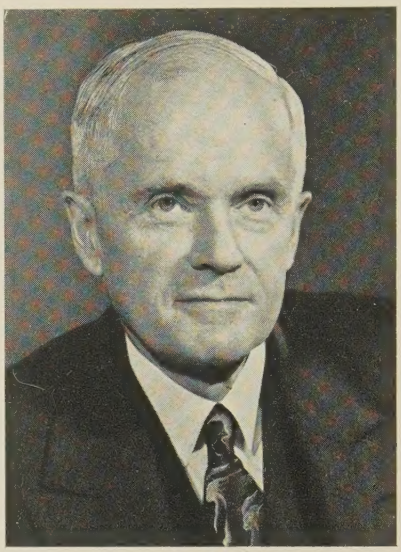
OBITUARY

Dr. P. D. Merica

Dr. P. D. Merica, who retired as President of The International Nickel Company of Canada, Ltd., in April 1954 but continued to serve the company on important projects and as Consultant to the officers, died on 20 October 1957, at the Phelps Memorial Hospital in Tarrytown, New York, where he had been taken after suffering a heart attack at his home on 18 October. He was 68.

Dr. Merica was a director of The International Nickel Company of Canada, Ltd., and its United States subsidiary, The International Nickel Company, Inc., and of American Metal Company, Ltd., Babcock and Wilcox Company, and Whitehead Metal Products Company, Inc.

Paul Dyer Merica was born in Warsaw, Indiana, on 17 March 1889. He attended De Pauw University from 1904 to 1907, and received an A.B. degree from the University of Winconsin in the following year. He obtained his Ph.D. from



the University of Berlin in 1914. From 1914 to 1919 he was associated with the metallurgical division of the U.S. Bureau of Standards in Washington. While there, Dr. Merica carried out a number of researches on Duralumin and other aluminium alloys and developed his theory of the precipitation-hardening of metals and alloys.

He first became associated with International Nickel in 1919, subsequently becoming Director of Research. He was made Assistant to the President of The International Nickel Company of Canada, Ltd., in 1932, a Director in 1934, Vice-President in 1936, Executive Vice-President in February 1949, and President in May 1952, retiring from the last position in April 1954. He was also President of the International Nickel Company, Inc., from May 1952 to April 1954.

In addition to his direction of executive and commercial affairs of the Company up to the time of his retirement in 1954, Dr. Merica had long been identified with research activities of the Company in Canada, the United Kingdom, and the United States. He was the author of many technical papers and articles. He received honorary D.Sc. degrees from De Pauw University (1934), Lehigh University (1938), Stevens Institute of Technology (1942).

For his contributions in the field of metallurgy and outstanding leadership in physical metallurgy, Dr. Merica was awarded the James Douglas Medal in 1929, the John Fritz Medal in 1938, the Institute of Metals (Platinum) Medal in 1941, the Franklin Institute Medal in 1942, and American Society for Metals Gold Medal in 1951.

Dr. Merica was a member of the National Academy of Sciences, a fellow of the American Association for the Advancement of Science, a member of the American Iron and Steel Institute, American Chemical Society, American Society

for Testing Materials, American Physical Society, Institute of Metals, Iron and Steel Institute, and Canadian Institute of Mining and Metallurgy. In September 1955, Dr. Merica was made an honorary member of the American Society for Metals. He was also an honorary member of the American Institute of Mining and Metallurgical Engineers, of which he was a former Vice-President and Director.

REFERENCES

1. L. R. Lewis, *J. Appl. Physics*, 1956, **27**, 837.
2. N. J. Petch, "Progress in Metal Physics," Vol. 5, p. 1. **1954**: London (Pergamon Press).
3. A. T. Churchman, *Acta Met.*, 1955, **3**, 22.
4. A. T. Churchman, *Nature*, 1953, **171**, 706.
5. C. F. Tipper, and E. O. Hall, *J. Iron Steel Inst.*, 1953, **175**, 9.

LETTER TO THE EDITOR

The Influence of Oxygen and Nitrogen on the Fracture Characteristics of Titanium Single Crystals

Although it has been accepted for some time that titanium is embrittled by impurity elements, little work has been done to elucidate the fracture mechanisms. It has been reported [1] that titanium filings are platelets with the (0001) plane in the plane of the platelet, which implies basal cleavage. In metals, low temperatures, high strain rates, and interstitial impurities encourage cleavage; [2] all these factors make it more difficult for dislocations to move, and so inhibit plastic flow. Since oxygen and nitrogen give rise to yield phenomena in titanium single crystals,[3] they may be expected to cause cleavage, and the purpose of the work described in the present letter was to test this idea.

Shouldered tensile specimens of iodide titanium with a gauge-length of 0·125 × 0·065 × 0·625 in. were used, and large cross-sectional grains were developed in the gauge-length by methods previously described.[4] Tensile tests were carried out at room and liquid-nitrogen temperatures, using either a modified Hounsfield extensometer with a strain rate of approximately 500%/hr. or a simple impact-testing machine. The specimens tested contained varying amounts of oxygen and nitrogen, introduced during melting. The results show that the fracture behaviour is characteristic of the impurity content. With a combined oxygen and nitrogen content of less than 0·03 at.-% the specimens failed by necking down after considerable plastic deformation, and there was no evidence of cleavage, even under low-temperature impact conditions.

Cleavage was found when the impurity content was 0·6 at.-%, for both strain rates and temperatures. Cleavage occurred mainly along $\{10\bar{1}0\}$ planes, but other fracture planes may have been operative. Examination of the fracture surfaces revealed that they were of a very irregular nature, as for iron,[5] and the usual surface markings, i.e. striations and twins, were observed.

From this work it is concluded that although the type of fracture does not depend upon strain rate or temperature, over the ranges studied, an increase in the oxygen and nitrogen content in titanium single crystals encourages cleavage. This may be due to the locking of dislocations, evidence of which has already been provided.[3]

The authors wish to thank Dr. T. E. Allibone, F.R.S., Director of the A.E.I. Laboratory, for permission to publish this letter.

J. Silverton

Department of Chemistry,
University of Glasgow.

E. Smith

Associated Electrical Industries, Ltd.,
Research Laboratory,
Aldermaston, Berks.

JOINT ACTIVITIES

British Nuclear Energy Conference

At a meeting of the Board of the B.N.E.C. on 9 October 1957, The Institute of Fuel, covering the interests of fuel technology, was admitted to membership of the B.N.E.C.

Binding facilities for Vol. II (1957) of the B.N.E.C. *Journal*, comprising January, April, July, and October numbers, are available at the following charges, which include postage:

Supplying binding case only, 12*s.* 6*d.* net.
Supplying case and binding, 25*s.* 0*d.* net.

Subscribers should send orders for binding cases, or their copies of the *Journal* and index (enclosing the appropriate remittance), direct to the B.N.E.C. printers, William Clowes and Sons, Ltd. (Publishing Dept.), Little New Street, London, E.C.4.

OTHER NEWS

"Engineering and Metallurgical Aspects of Fatigue"

A course of ten lectures on "Engineering and Metallurgical Aspects of Fatigue" will be delivered at Battersea College of Technology on successive Tuesdays, beginning on 14 January 1958. The lectures, which will be from 7 to 9 p.m., will be given by a number of specialists drawn from both industry and research.

The fee for the course is £1. Enrolment forms and further details may be obtained from the Secretary (Fatigue Lectures), Battersea College of Technology, London, S.W.11.

Conference on Precipitation Processes in Steels

A Conference on Precipitation Processes in Steels arranged by the Department of Metallurgy, University of Sheffield, will take place in the Department, St. George's Square, Sheffield 1, between Wednesday, 2 July and Friday, 4 July 1958.

There will be four main sessions: (1) precipitation in ferritic steels, (2) precipitation in austenitic steels, (3) intergranular fracture in steels, and (4) precipitation during creep.

Accommodation for participants in the Conference has been arranged in Stephenson Hall, University of Sheffield. Attendance at the meetings will be limited, and early applications are advised. There will be a Registration Fee of £2, which will cover the cost of preprints of a number of the papers to be presented and of light refreshments during the Sessions.

Application forms and further information can be obtained from The Professor of Metallurgy, University of Sheffield, St. George's Square, Sheffield 1.

"Modern Metallographic Techniques"

A course of six lectures and four practical periods dealing with "Modern Metallographic Techniques" will be held at the Northampton College of Advanced Technology, St. John Street, E.C.1. The course will begin on 16 January 1958 at 6.30 p.m. and continue on subsequent Thursdays. The syllabus covers the theory and practice of: recent polishing and etching techniques; special methods of illumination in microscopy; micro-hardness testing; and electron microscopy. The fee for the course is £1 (lectures only 10s.). Enrolment may be effected by personal attendance at the College or by post. In the latter case those wishing to enrol should supply (*a*) name and address, (*b*) qualifications, and (*c*) name of employer (for record purposes only) and should enclose the fee and a stamped addressed envelope.

DIARY

The Institute

15 January. "The Mechanism of Clustering and Precipitation in Metals" by Dr. D. Turnbull. (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)

Local Sections and Associated Societies

23 January. Birmingham Local Section. "Electric Furnace Developments", by P. F. Hancock. (Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, at 6.30 p.m.)

24 January. North East Metallurgical Society. "Some Views on the Use of Oxygen in Steelmaking", by T. F. Pearson. (Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough, at 7.15 p.m.)

29 January. Manchester Metallurgical Society. "The Behaviour of Metals at High Temperatures", by Dr. N. P. Allen. (Manchester Room, The Central Library, Manchester, at 6.30 p.m.)

4 February. Oxford Local Section. "Technical Control of Some Metalworking Processes", by Dr. A. R. E. Singer (Cadena Café, Cornmarket Street, Oxford, at 7.0 p.m.)

4 February. South Wales Local Section. "Secondary Metal Recovery", by H. J. Miller. (Department of Metallurgy, University College, Singleton Park, Swansea, at 6.30 p.m.)

6 February. Birmingham Local Section. "Porous and Infiltrated Metals", by J. E. Elliott. (College of Technology, Gosta Green, Birmingham, at 6.30 p.m.)

6 February. Leeds Metallurgical Society. "The Russian Steel Industry", by R. Wilcock. (Lecture Room C, Chemistry Wing, The University, Leeds 2, at 7.15 p.m.)

6 February. London Local Section. "Corrosion by Liquid Metals", by Dr. B. R. T. Frost. (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)

10 February. East Midlands Metallurgical Society. Members' Night. Short papers presented by Members. (Nottingham and District Technical College, Shakespeare Street, Nottingham, at 7.30 p.m.)

10 February. Scottish Local Section. "Recent Developments in the Foundry", by Dr. D. V. Atterton. (Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)

12 February. Manchester Metallurgical Society. "Plastics versus Metals", by J. M. J. Estevez. (Manchester Room, The Central Library, Manchester, at 6.30 p.m.)

13 February. Liverpool Metallurgical Society. "Wear in Cast Iron", by Dr. H. T. Angus. (Liverpool Engineering Society, 9 The Temple, Dale Street, Liverpool, at 7.0 p.m.)

APPOINTMENTS VACANT

METALLURGISTS required for control and development work on the production of non-ferrous metals. A degree or equivalent qualification is necessary with industrial experience. The posts have ample scope of advancement for people with initiative. Adequate salary based on qualifications and experience; contributory pension scheme; assistance with living accommodation after short period of service. Apply in confidence to Labour Manager, Enfield Rolling Mills, Ltd., Brimsdown, Enfield, Middx.

PROFESSORIAL CHAIR—Metallurgy or Physics of Metals—no administrative assignments—Eastern United States. Starting salary $15,000 per year. September 1958 appointment. Recommendations as well as applications solicited. Box No. 430, Journal of the Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

SOUTH AFRICAN BUREAU OF STANDARDS

METALLURGIST

Applications are invited for the post of metallurgist at the South African Bureau of Standards, Pretoria. Candidates should hold a university degree and have had at least five years' experience covering, if possible, metallography and ferrous and non-ferrous metallurgy. Salary will be on the scale £1080 × £60–£1380, the starting salary depending upon experience and qualifications. A cost of living allowance of £234 p.a. is payable to married male officers.

The Council has a five-day week, generous leave privileges, leave bonus, and provident fund. Passages to South Africa of the selected candidate and his family will be paid.

Further information and application forms are obtainable from the South African Scientific Liaison Officer, Africa House, Kingsway, London, W.C.2.